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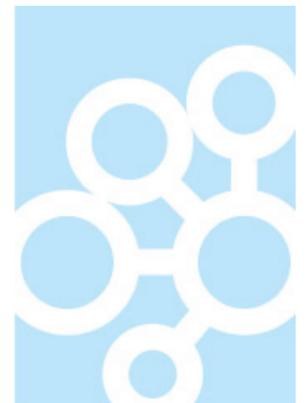Sort by: Relevance

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Computer, Electrical & Communication Engineering (ICCECE), 2023 International Conference on

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Human Interaction-Free Object Localization in a Scene

Sabyasachi Moitra, **Sambhunath Biswas**

January 2023, Complete, p.1 - 5

Object detection methods use NMS (Non-Maximum Suppression) to remove multiple detections for a particular object for its localization. To perform this task, NMS requires a confidence threshold and an IoU (Intersection-over-Union) threshold which need to be supplied by an user. Thresholds are fixed ...

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Early Screening of Valvular Heart Disease Prediction using CNN-based Mobile Network

Tanmay Sinha Roy, **Joyanta Kumar Roy**, **Nirupama Mandal**

January 2023, Complete, p.1 - 8

The rapid emergence of technology and big data science opened up a significant amount of work that has been carried out in the field of feature extraction and classification techniques of heart sound using various deep learning methods. Practically, medical practitioners use the same old scientific method and practice...

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Improvement of Transient Stability in Power System Using Rotating Disc Type Passive Magnetic Fault Current Limiter

Asit Kumar Mondal, **Tapan Santra**

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A revolving disc-type Permanent Magnet fault Current Limiter (PMFCL) is proposed as a means of improving the transient stability of a Single Machine Infinite Bus (SMIB) with double circuit transmission lines. This new configuration of the PMFCL can restrict the fault current without affecting the normal ...

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Development of a Laboratory Prototype of a Three Phase Three Bus Transmission System Emulator

Jayanta Piri, **Gautam Bandyopadhyay**, **Mainak Sengupta**

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In this paper an analog emulator of a three phase three bus transmission system has been developed. A practical transmission line data of a 100km ACSR based conductor at 230kV(L-L) and at 100MVA(3-Φ) has been scaled down at 415V(L-L) and 10kVA(3...

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Satellite Wi-Fi Terminal for Post-Disaster Emergency Communication Management

Leena Kohli Kapoor, **Sunkara Ashish**

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Post disaster Emergency communication in partly functional or completely isolated scenarios requires a solution that is autonomous and resilient to network vulnerabilities due to both man-made and natural disasters. This paper presents the design of Wi-Fi based Mobile Satellite Service (MSS) terminal and the application developed ...

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Ensemble Learning And its Application in Spam Detection

Arka Ghosh, **Raja Das**, **Shreyashi Dey**, **Gautam Mahapatra**

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An individual model is not always sufficient enough to classify an email. Each spam mail has features that distinguish it from any other regular mail. A model might not always use that feature for classification and thus produce erroneous results. It is essential to cross-verify the output ...

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Comparative Analysis of MIMO Multiuser Signal Detection

Subhrajit Dey, **Soumitra Bhowmick**

January 2023, Complete, p.1 - 5

The advancements in wireless communication have been incredibly helpful to our modern way of life. The many put in and much product technology, which involves using several broadcasts and receive antennas, will improve this. The high SNR system makes use of MIMO to boost capacity. Supporting more ...

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A Review of Multi-Band Reflectarray Antenna Designs with Mutual Coupling Considerations

Venkatraman S, **Komathi B J**

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The paper reviews some of the relatively recent, and older reflectarray antenna designs in the literature, that comprised a single layer of substrate and unit cell, as well as multiple layers of substrate and unit cell, with considerations on suppressing the mutual coupling between the different bands for...

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Seven Level CHB Multilevel Inverter based STATCOM using Decoupled Control & DC Voltage Balancing

Vineet Bharadwaj, **Samudra Panda**, **Sourabh Kundu**, **Subrata Banerjee**

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In order to increase the overall power factor of the grid, this study suggests the operation of a seven-level Cascaded H-Bridge (CHB) based Static Synchronous Compensator (STATCOM) with decoupling control algorithm. This control method also exhibits the voltage balancing of dc-link capacitors connected with...

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Investigation of Hybrid Power Performance with Solar Module & Wind Turbine in MATLAB

Md. Shajedul Islam, **Sharifur Rahman**, **Suman Chowdhury**

January 2023, Complete, p.1 - 4

This paper represents the investigation of hybrid power performance of solar & wind energy with a battery storage system. This extension is created into MATLAB Simulink environment. This paper tries to investigate the output power using Simulink and improve model design to get higher efficiency. It's performed ...

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Diabetic Retinopathy - An Ensemble Approach

Aditi Rastogi, **Timsal Zehra Rizvi**, **Dr Deeba Kanan**

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Diabetes is a lifestyle disease that affects many people all over the world, with India leading the count of diabetic patients. The most important organ in the human body is the eye. Any anomaly will impact the functioning of life in its operation. The main component of the...

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TiO2 Thick film Gas sensor for Detection H2S Gas Using ANN and Machine Learning Technique

Amit Gupta, **Shashi Kant Dargar**, **Abha Dargar**

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Undoped CuO doped thick film gas sensor have been developed for H2S toxic gas detection to review the sensitivity and sensor response using ANN technique at 150°C . TiO2 based thick film sensor was untrue on a 1" x 1" alumina substrate. It incorporate of a gas ...

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Effectiveness of Feature Collaboration in Speaker Identification for Voice Biometrics

Arunima Das, **Lakshi Prosad Roy**, **Santos Kumar Das**

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Voice biometrics is a promising solution to online banking that doesn't need one's physical presence, unlike fingerprint and retina scanners. Systems for identifying speakers are a crucial component of biometric technologies. Over the past few years, numerous speaker identification systems have been developed and used; ...

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Network Throughput Improvement in Wi-Fi 6 over Wi-Fi 5: A Comparative Performance Analysis

Dwaipayan Bandyopadhyay, **Sammilita De**, **Sinjini Hom Roy**, **Deepshikha Biswas**, **Madhura Bhose**, **Raja Karmakar**

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Novel Wi-Fi version 6 is the youngest generation of Wi-Fi standard, which supports better throughput than its successful predecessor Wi-Fi 5. Both of these standards have several physical (PHY) layer enhancements, such as higher channel bandwidths (40/80/160 MHz), also the improved...

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Detection and Identification of Rice Pests Using Memory Efficient Convolutional

Neural Network

Zihad Hossain Nayem, **Iqbal Jahan**, **Abdul Aziz Rakib**, **Solaiman Mia**

January 2023, Complete, p.1 - 6

Rice pest detection is a very important part for the development of our agriculture. Numerous farmers are impacted worldwide by rice pests that frequently endanger the sustainability of rice production. There are many types of machine learning techniques for detecting the rice pests. CNNs (Convolutional Neural Networks) ...

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Optimized Novel DC to DC Converter for PV Fed Grid Tied EV Charging Station

Tharwin Kumar, **Christober Asir Rajan**

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The use of Electric Vehicles (EVs) has been increasing in a wider range owing to the increase in population and energy demand.Nowadays, the Solar, which is one of the RES (Renewable Energy sources),assists in EV charging and is gaining higher importance. Moreover, the main...

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A Microcontroller Based FIR Filter With Dynamic Stabilization of Sampling Frequency

Sayantan Banerjee, **Biswajit Bhattacharyya**, **Sugata Munshi**

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A real time FIR filter has been implemented using an ATmega2560 based microcontroller. The digital filter designed theoretically cannot be implemented in practice until the sampling frequency remains constant on different boards, using different versions of compilers and the order of the filter, therefore, can be assessed accurately...

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An Autonomous Assistance Robot for Multi-Purpose Medical Applications Using ROS

Pawan Kadam, **Pratik Padalkar**, **Aniket Mohite**, **Shantanu Mirajgave**, **Santwana Gudadhe**

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Over the years, the robotic industry has made significant growth in the manufacturing sector due to the need for collaborative and interactive robots. But it is not the case for service sectors, especially in the healthcare sector. A lack of emphasis is given to healthcare which has led...

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A Novel Low-Complexity Power-Efficient Design of Standard Ternary Logic Gates using CNTFET

Anisha Paul, **Buddhadev Pradhan**

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This paper introduces novel low-complexity and power-efficient designs of standard ternary (ST) logic gates like the standard ternary inverter (STI), NAND (STNAND), NOR (STNOR), and XOR (STXOR) gates, along with the ternary minimum (TMIN) and ternary maximum (TMAX) operators...

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Performance Analysis of Three-Phase Cascaded Hbridge Multi Level Inverters

Dharmbir Prasad, **Rudra Pratap Singh**, **Azizul Islam**, **Aritra Roy**, **Ranadip Roy**, **Sushri Mukherjee**

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Power generation from renewable energy sources is environment friendly. These are being integrated into the grid to enhance green power generation. It is necessary to enhance system performance by attaining improved output power quality, decreased losses, and fewer filtering components and transformers in order to effectively utilize these...

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Analysis and Processing of Spatial Remote Sensing Multispectral Imagery using Deep Learning Techniques

Omar Soufi, **Fatima Zahra Belouadha**

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The use of machine learning models, particularly deep learning models, for the analysis of remote sensing products, especially multispectral satellite images, has recently experienced exponential development. Therefore, this article will present a protocol for processing multispectral satellite images by deep learning through the latest methods used in...

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Multiplexing of Infrared Images Using Periodic Optical Carrier Modulation

Banhi Dutta Choudhuri Das, **Arijit Saha**

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With the huge growth in communication technology in recent times, transmission of data as well as high-resolution images over long distance has become a necessity. Internet is playing the key role in this area. As images require huge bandwidth for transmission, so compression of images is ...

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Model Based Test Framework for verification of Flight Control Software

Chandrashekhar Singh, **Jagadish Shivamurthy**, **Asha Garg**

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Verification and Validation (V&V) of Safety Critical Software such as that of Flight Control Computer is an effort intensive and critical task. Accordingly standards like DO-178C lay much importance on the V&V aspects of the airborne software. Generation of typical and relevant test vectors over...

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A New Search Algorithm for Calculating the Maximum Loadability of a Transmission System

Jayanta Piri, **Gautam Bandyopadhyay**, **Mainak Sengupta**

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In today's deregulated electric power systems both government and private utilities are participating in all the available sectors i.e. generation, transmission and distribution. The ownership of each sector may belong to different agencies or companies. In such a scenario the scope of each sector is clearly...

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Building a Classification Model based on Feature Engineering for the Prediction of Wine Quality by Employing Supervised Machine Learning and Ensemble Learning Techniques

Mauparna Nandan, **Harsh Raj Gupta**, **Moutusi Mondal**

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In today's world, consumers are more concerned regarding the quality of any product. Different approaches are being deployed by various industries to guarantee the excellent quality of their products. Thus, quality certification serve as a vital authentication mechanism for majority of the industries for promoting their numerous...

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Network Traffic Classification Using Supervised Learning Algorithms

Mira Rani Choudhury, **Muraleedharan N**, **Parimal Acharjee**, **Aleena Terese George**

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Network traffic classification is crucial for traffic monitoring and application-based policy enforcement. However, the widespread use of encrypted protocols has greatly challenged conventional traffic classification techniques using packet payload and port numbers. For the network application in this paper, two machine learning algorithms, Decision Tree (DT...

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Investigation on Efficient Machine Learning Algorithm for DDoS Attack Detection

R. Sahila Devi, **R. Bharathi**, **P. Krishna Kumar**

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Internet of Things (IOT) is a general term for all interconnected devices as well as the technology that enables object-to-object and cloud-to-object communication. However, there are several regular and dangerous threats to the development of this technology. The Distributed DoS (DDOS) attacks ...

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Envy Prediction from Users' Photos using Convolutional Neural Networks

Mohaimenul Azam Khan Raiaan, **Abdullah Al Mamun**, **Md. Adnanul Islam**, **Mohammed Eunus Ali**, **Md. Saddam Hossain Mukta**

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Envy is often considered a negative trait in human behavior. However, envy also has a positive insight that can motivate a person to accomplish her desired goals. In this paper, we propose a novel method to identify a user's state of envy (i.e., benign ...

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Prediction of Idiopathic Recurrent Spontaneous Miscarriage using Machine Learning

Dadoma Sherpa, **Rajwade Dhruva Abhijit**, **Imon Mitra**, **Dhruba Dhar**, **Sunita Sharma**, **Pratip Chakraborty**, **Koel Chaudhury**

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Recurrent spontaneous miscarriage (RSM) is defined as the spontaneous loss of two or more clinically diagnosed pregnancies within 20 weeks of gestation. Despite extensive research, etiology remains undefined in 50% of RSM cases, and are classified as idiopathic. Thus, further study is warranted to understand molecular...

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A New hybrid Feature selection-Classification model to Improve Cancer Sample Classification Accuracy in Microarray Gene Expression Data

Ritaban Bandyopadhyay, **Arijt Das Sharma**, **Bidya Dasgupta**, **Ankita Ghosh**, **Chandra Das**, **Shilpi Bose**

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Machine learning techniques are one kind of techniques of Artificial Intelligence that enables systems to learn and improve from data without being explicitly programmed. Machine learning techniques are widely used in medical applications since it has the property to detect inherent patterns from large and complex datasets. Cancer classification...

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Relative Study on Performance analysis of DMFET and DMTFET based Transducers

Shayantika Dhar, **Bishal Maji**, **Sunai Das**, **Munai Das**, **Sangeeta Jana Mukhopadhyay**

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The key contribution of current paper involves optimization of transducer electrical response for dielectrically modulated electrochemical biosensing applications. In order to optimize the performance of transducer element of dielectrically modulated biosensors a comprehensive physical understanding on the working principle of dielectric modulation is necessary for analyzing the comparative electrical ...

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Retinal and Semantic Segmentation of Diabetic Retinopathy Images Using MobileNetV3

Manish Prajapati, **Santos Kumar Baliarsingh**, **Jhalak Hota**, **Prabhu Prasad Dev**, **Shuvam Das**

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The eye is affected by diabetic retinopathy (DR), a condition caused by diabetes. DR may initially show no symptoms or cause minor vision problems. However, it may lead to blindness if not diagnosed and treated early. The goal of this research is to segment and classify ...

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Analysis of a Hysteresis Current Control DC–DC Buck Converter Suitable for Wide Range of Operating Conditions

Roshan Ghosh, **Koustav Dasgupta**, **Sakti Prasad Ghoshal**

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It is very crucial to maintain high efficiency in a dc–dc converter over an extensive load current range in order to extend the battery-life in advanced fast switching applications. In order to improve the performance of DC-DC buck converters hysteresis current control technique is adopted here ...

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Predicting Gender from Human or Non-human Social Media Profile Photos by using Transfer Learning

Sadman Sakib, **Nur Mohammad Fahad**, **Mohaimenul Azam Khan Raiaan**, **Md. Anisur Rahman**, **Abdullah Al Mamun**, **Salekul Islam**, **Md. Saddam Hossain Mukta**

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Social media profile photos can demonstrate a variety of information about a person, including her personality, behavior, preference, individuality, and gender. Prediction of gender from social media photos has a number of real life applications such as gender marketing and identification of camouflaged profile photos. Numerous ...

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Flop Resistance Controlled Circulating Current Minimization of Parallel Quadratic Step-Up Converter in DCMicro grid Applications

S. Hema, **Y. Sukhi**, **R. Suguna**

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In many situations high Current is required in high demand applications likeall automized industries, DC Microgridetc., Same converter modules connected in parallel combination results in generation of higher output current, but when connecting two converters in parallel creates the problem ofuneven distribution of current in each converter module...

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Power Spectral Density, Higuchi's Fractal Dimension and Detrended Fluctuation Analysis of sEMG at Varying Weights

Sanjoy Kumar Das, **Nilotpal Das**, **Monisha Chakraborty**

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Our muscle cells produce rhythmical potentials that get totalized as millions of cells discharge simultaneously and represent as a waveform, the recording of this waveform is known as Electromyogram (EMG). The device is used this recording is called Electromyograph and process of this recording is known as Electromyography...

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Effect of barrier variabilities on the strain propagation and 2DEG profile of GaN/AlGaN HEMT heterostructures

Priyesh Kumar, **Jhuma Saha**

January 2023, Complete, p.1 - 6

This work presents an analysis of strain distribution and depth of 2DEG (2-Dimensional Electron Gas) in AlGaN/GaN HEMT (high electron mobility transistor) heterostructures for different variabilities. In this, we have simulated both single and double-channel HEMT heterostructures. We studied two types of barrier ...

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Real-Time Emotional Analysis

Andreas Savva, **Vasso Stylianou**

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This paper describes the development of a system which captures students' facial expressions during a lecture and by using machine learning methods it produces a timeline of their emotions. Examples of such emotions are: happiness, surprise, fear, neutral and sadness. This can assist an educator to ...

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Prediction of Recurrence in Non Small Cell Lung Cancer Patients with Gene Expression Data Using Machine Learning Techniques

Sudipto Bhattacharjee, **Banani Saha**, **Sudipto Saha**

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Lung cancer is the deadliest cancer and the non-small cell lung cancer (NSCLC) contributes to 80-85% of lung cancer cases. Cancer recurrence is defined as the resurgence of cancer despite the surgical resection of the tumor and occurs in more than 30% of NSCLC patients....

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Design And Development of Cost-Effective Automatic Solar Panel Cleaning System

Abdullah Mohammed Zaki Khayyat, **Abdulrahman Hamad Alharthi**, **Faisal Lafi Almohammadi**, **Ziyad Saad Almarwani**, **Tawfeeq Shawely**, **Mohammed E. Dessouki**, **Youssef Mobarak**, **Nithiyananthan Kannan**

January 2023, Complete, p.1 - 8

The main aim of this work is to design and develop an automatic solar cleaning system for preventing the soiling effect on PV panels. This soiling effect hinders sunlight from reaching PV panels, and it also shortens the life of solar panels in the long run. To optimize ...

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A Fast-Converging Radial Basis Function Neural Network-Based MPPT Controller for Static and Dynamic Variations in Solar Irradiation

Chepuri Venkateswararao, **Kanasottu Anil Naik**

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The use of maximum power point tracking techniques, often known as MPPT algorithms, is required to improve the performance of PV systems. In rapidly varying atmospheric conditions, the traditional MPPT approaches do not work as intended. In the paper, a perturb and observe technique based MPPT algorithm...

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Optimal Design of (α + β)-Order Butterworth Filter and Its Realization Using RLβCα Circuit

Shibendu Mahata, **Ritu Rani De Maity**

January 2023, Complete, p.1 - 8

This paper presents the implementation of an optimal fractional-order Butterworth filter (FBF) using the RLβCα, where 0 < α, β < 1, series circuit. Improved Particle Swarm Optimization algorithm is used to determine the coefficients of three s-domain based fractional-order transfer functions that approximate...

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Employee attrition prediction for imbalanced data using genetic algorithm-based

parameter optimization of XGB Classifier

Karabi Konar, **Saptarshi Das**, **Samiran Das**

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Attrition of employees is vital for any organization as it significantly influences productivity and hampers the long-term growth strategies of the organization. Since employee attrition leads to loss of skills and experiences any organization always try to find a way to retain their employees to reduce training and ...

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Analyzing and Addressing Data-driven Fairness Issues in Machine Learning Models used for Societal Problems

Vishnu S. Pendyala, **HyungKyun Kim**

January 2023, Complete, p.1 - 7

This work aims to systematically analyze and address fairness issues arising in machine learning models because of class imbalances present in data, specifically used for addressing societal problems and providing unique insights. Using a specific data set, spectral analysis is first performed to present evidence and characterize the ...

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Optimal Design of $(\alpha + \beta)$-Order Butterworth Filter and Its Realization Using $RL_\beta C_\alpha$ Circuit

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Abstract—This paper presents the implementation of an optimal fractional-order Butterworth filter (FBF) using the $RL_\beta C_\alpha$, where $0 < \alpha, \beta < 1$, series circuit. Improved Particle Swarm Optimization algorithm is used to determine the coefficients of three s-domain based fractional-order transfer functions that approximate the FBF characteristics, such that the condition of 0 dB gain at DC is satisfied. Stability, roll-off, accuracy, and algorithm convergence for the proposed FBFs are evaluated. The proposed designs achieve significantly lower error as compared to the recent literature. The Bruton transformation, generalized to the fractional domain, is employed to realize inductor-less FBF circuits. Simulations are carried out in OrCAD PSPICE to verify the design feasibility.

Index Terms—fractional Bruton transformation, fractional order Butterworth filter, fractional order circuits, generalized impedance converter, improved particle swarm optimization

I. INTRODUCTION

Fractional calculus is concerned with employing non-integer order differential and integral operators, and may be regarded as a super-set of the classical/traditional calculus [1], [2]. Several definitions of a fractional derivative, such as the Grünwald-Letnikov, Riemann-Liouville, etc., exist in the literature. For example, the Grünwald-Letnikov derivative of order α, where $0 < \alpha < 1$, for a function $f(t)$, is defined by (1) [1].

$$D_t^\alpha f(t) := \lim_{h \to 0} \frac{1}{h^\alpha} \sum_{j=0}^{\infty} (-1)^j \binom{\alpha}{j} f(t - jh) \quad (1)$$

where $\binom{\alpha}{j} = \frac{\Gamma(\alpha+1)}{\Gamma(j+1)\Gamma(\alpha-j+1)}$ correspond to the binomial coefficients; $\Gamma(\cdot)$ denotes the gamma function. The Laplace transform of (1), subject to zero initial conditions, is given by (2).

$$\int_0^\infty e^{-st} D_t^\alpha f(t) dt = s^\alpha F(s) \quad (2)$$

where s^α is called the fractional Laplacian operator.

The concepts of fractional calculus, when applied to circuit theory, have led to the formulation of generalized definitions for the traditional circuit elements [3]. For example, the impedance of the traditional integer-order capacitor and inductor is $1/(sC)$ and sL, respectively. However, a fractional capacitor of order α and a fractional inductor of order β, where $0 < \alpha, \beta < 1$, are characterized by impedances of
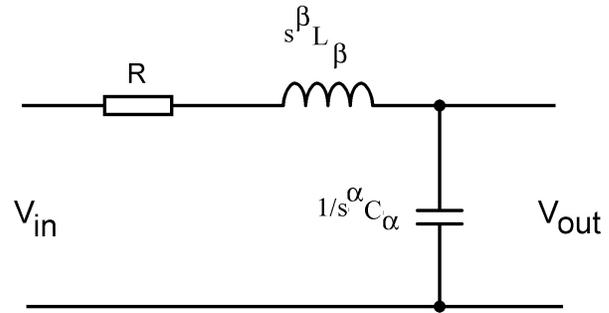

Fig. 1. $RL_\beta C_\alpha$ series circuit acting as a low pass filter.

$1/(s^\alpha C_\alpha)$ and $s^\beta L_\beta$, respectively. The pseudo-capacitance C_α and pseudo-inductance L_β are expressed in units of Farad per second$^{1-\alpha}$ (F/sec$^{1-\alpha}$) and Henry per second$^{1-\beta}$ (H/sec$^{1-\beta}$), respectively [4], [5].

A series RLC circuit can exhibit low pass filter characteristics when the response is considered across the capacitor. Note that there are three free parameters (R, L, and C) for such a circuit. In contrast, an $RL_\beta C_\alpha$ series circuit provides better flexibility in tuning the filter characteristics, since, two additional parameters (α and β) are also now available [6], [7]. An $RL_\beta C_\alpha$ series circuit is shown in Fig. 1. The transfer function for the low pass filter circuit presented in Fig. 1 is given by (3).

$$\frac{V_{\text{out}}(s)}{V_{\text{in}}(s)} = T(s) = \frac{1}{L_\beta C_\alpha s^{\alpha+\beta} + RC_\alpha s^\alpha + 1} \quad (3)$$

The model represented in (3) exhibits: (i) DC gain of 1 (0 dB), (ii) high frequency gain of 0, and (iii) stopband attenuation of $-20(\alpha + \beta)$ decibel per decade (dB/dec).

A traditional Butterworth filter of order n ($n \in \mathbb{Z}^+$) yields $-20n$ dB/dec attenuation in the stopband [8]. A fractional-order Butterworth filter (FBF) of order $(n + \alpha)$, where $\alpha \in (0, 1)$, can theoretically achieve a roll-off of $-20(n + \alpha)$ dB/dec [9]. Integer-order approximations of FBFs have been carried out using substitution [10] or optimization methods [11]. The design and implementation of the FO transitional Butterworth-Butterworth filter was also recently reported [12]. Various methods were reported to model the analog FBFs